No. II.

IMPROVED SAFETY-CHAMBER TO THE OXY-HYDROGEN BLOW-PIPE.

The LARGE SILVER MEDAL *was this session presented to Mr.* HENRY WILKINSON, *of Ludgate-hill, for his improved* SAFETY-CHAMBER TO THE OXY-HYDROGEN BLOW-PIPE. *The following communication has been received from Mr. Wilkinson on the subject, and a model of the apparatus has been placed in the Society's repository.*

SIR, Ludgate-hill, February 11, 1824.

IN consequence of an explosion which took place last November, while volatilizing platinum with Mr. Gurney's oxy-hydrogen blow-pipe, I was induced to try some experiments, in order to render that instrument, if possible, more secure. (It is but justice here to observe that at the time of the explosion I was using a much larger and longer jet than any of those sold with the blow-pipe, and differently situated.) If the Society should consider the result I have obtained worth notice I shall be happy to prove the correctness of it by experiment and testimony.

The construction of Mr. Gurney's safety-tube is known to the Society; the chambers in which not being able, under certain circumstances, to arrest the retrograde motion of the flame, I thought it probable that the interposition of any bad conductor of caloric might effectually prevent its return: how far I have succeeded may be judged by the

following experiments made with the same jet, all other circumstances of position and dimensions being correctly alike.

Having first chosen such a jet and arrangement of parts as would *always* explode with Mr. Gurney's safety-tube on diminishing the pressure, and would *frequently* so at the moment of ignition, I removed that and substituted another safety-tube entirely filled with wire-gauze; I still, however, found the flame return, driving out the cork every time, as in the preceding experiment.

I then tried a third tube, into which I had introduced, between the layers of wire-gauze and in the centre, some asbestus, previously beaten with a mallet and pulled out, so as to resemble floss silk. With this I could never succeed in causing an explosion to take place, although the flame of a wax taper was kept close to the orifice, and the pressure was diminished as gradually as possible; nor did it explode even when the orifice of the jet was enlarged. These experiments have been repeated by myself, and by a friend, a great number of times, with the same result. I am not aware that asbestus has ever been proposed or employed before for this purpose. The advantage of using this substance is evident, as the fibres cross each other in every possible direction, thus forming a filter for the gases to pass through much finer than any wire-gauze, and by its bad conducting quality it prevents those layers of wire-gauze which are behind it from being heated when an explosion takes place in the cavity of the jet.

The cylinder *f f*, fig. 2, plate I., is of brass, about three quarters of an inch long and the same diameter internally, (the figure represents it of the real size), and is filled in

the following order, beginning at the end into which the jet *j*, screws.

The wire-gauze being cut to fit the cylinder correctly, each disc is introduced separately, having a small quantity of glazier's putty round the edge, and is pressed in with a piece of wood turned to fit the cylinder. After the first ten layers of wire-gauze *g*, have been introduced, a layer of asbestus *h*, is inserted one-eighth of an inch thick, equally laid and not pressed in too hard, then come ten more layers of wire-gauze *g*, another layer of asbestus *h*, and, lastly, twenty discs of wire gauze *g*, the two ends of the cylinders being concave, in order to afford as large an area as possible for the passage of the gas from the entrance pipe *i*, to the jet. As the object of this arrangement is to keep the last series of wire-gauze cool by the interposition of bad conductors of caloric, it appears probable that the safety would be rendered theoretically more perfect if the cylinder itself were a bad conductor, such as earthenware having brass caps cemented on the ends; or platinum, if metal were made use of, on account of its low conducting power. A brass cylinder, however, appears to be perfectly safe for every purpose, as I have never been able to cause an explosion to take place, although I have allowed the flame to retrograde, by gradually diminishing the pressure from 60 to 100 times successively, while using very long jets of one-eighth of an inch diameter at the aperture and much larger within. The wire-gauze should not be finer than from 3600 to 4900 apertures to the square inch, as it is liable to be fused by the return of the flame. I found that when I used wire-gauze with 8100 apertures it was destroyed in a very short time.

The model which accompanies this letter is made of glass, in order to show the internal arrangement.

I am, Sir,

A. Aikin, Esq.
Secretary, &c. &c.

&c. &c. &c.

HENRY WILKINSON.

No. III.

STOP-COCK FOR TRANSFERRING CORROSIVE GASES.

The SILVER VULCAN MEDAL was this Session presented to Mr. T. GRIFFITHS, Church-street, Kensington, for an improved STOP-COCK FOR CHEMICAL PURPOSES, &c. A model of his invention has been placed in the Society's repository.

THE common brass stop-cocks, if they have been employed for confining acid or other gases, especially when under pressure, are soon corroded throughout their whole interior extent, so that the plug or key becomes immoveable, and the bore filled up with a salt of copper, the consequent result of chemical action upon the metal of the instrument. A stop-cock made entirely of glass has also many disadvantages: its size and clumsiness of form, together with the difficulty of uniting it securely to other apparatus, are inconveniences often felt by the experimentalist.

To obviate them, and to offer a method in which stop-cocks of the common form are united with security against